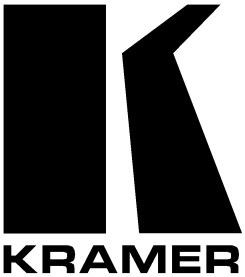
Kramer Electronics, Ltd.



USER MANUAL

Model:

TP-400FW

FireWire Range Extender

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This addendum clarifies that only SHIELDED CABLES should be used with the TP-400FW.

Amendment to Section 3

In the following text— ● Enables 1394 100Mbps signals to be transmitted and received across an extended range on unshielded twisted pair cable—the word "unshielded" is replaced by "**shielded**".

1 Introduction

Welcome to Kramer Electronics (since 1981): a world of unique, creative and affordable solutions to the infinite range of problems that confront the video, audio and presentation professional on a daily basis. In recent years, we have redesigned and upgraded most of our line, making the best even better! Our 350-plus different models now appear in 8 Groups[1], which are clearly defined by function. Congratulations on purchasing your Kramer **TP-400FW** *FireWire Range Extender*, which is ideal for:

- Digital video production, editing studios, and digital video live broadcasting
- PC FireWire port extensions and long cable drivers

The package includes the following items:

- **TP-400FW** *FireWire Range Extender*
- One 6 pin to 6 pin Connector Cable[2], a power cord[3], and this user manual[4]

2 Getting Started

We recommend that you:

- Unpack the equipment carefully and save the original box and packaging materials for possible future shipment
- Review the contents of this user manual
- Use Kramer high performance high resolution cables[5]

3 Overview

The high quality **TP-400FW** is a unique FireWire Range Extender that lets you extend the standard 4.5m (13.5ft) FireWire range considerably: to up to 100m (300ft) with 2 interconnected units, and up to 200m (600ft) with 3 interconnected units, etc., using inexpensive, widely used CAT 5 cable. The **TP-400FW** features a set of 4 connection status LEDs.

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1 GROUP 1: Distribution Amplifiers; GROUP 2: Video and Audio Switchers, Matrix Switchers and Controllers; GROUP 3: Video, Audio, VGA/XGA Processors; GROUP 4: Interfaces and Sync Processors; GROUP 5: Twisted Pair Interfaces; GROUP 6: Accessories and Rack Adapters; GROUP 7: Scan Converters and Scalers; and GROUP 8: Cables and Connectors

2 The original FireWire standard defines a cable with identical 6 pin connectors at both ends that can be plugged in either direction, between nodes, and carries the signal and the power. In the IEEE 1394a supplement, two kinds of FireWire 4 pin connector cable became available without the power pins: a 6 pin connector at one end and a 4 pin connector at the other end, and 4 pin connectors at both ends

3 We recommend that you use only the power cord that is supplied with this machine

4 Download up-to-date Kramer user manuals from the Internet at this URL: http://www.kramerelectronics.com/manuals.html

5 The complete list of Kramer cables is on our Web site at http://www.kramerelectronics.com (click “Cables and Connectors” in the Products section)

Using the **TP-400FW** you can:

- Access the FireWire port from both the front and rear panels
- Interconnect up to six **TP-400FW** units (together with the FireWire sources/acceptors) that derive their power from the first local **TP-400FW** unit, with a total current of up to 1.5A/12V

The **TP-400FW** *FireWire Range Extender* is based on FireWire which:

- Is a serial bus standard[1] that enables quick universal interfacing between digital video, audio and data, and computer hardware items[2]
- Is simple to use and operates independently of the host system letting you connect items for extended distances
- Supports Plug and Play[3], hot swapping[4] and isochronous[5] and asynchronous applications

In particular, the **TP-400FW**:

- Supports the provisions of the IEEE 1394a-2000 and 1394-1995 Standards for the High Performance 1394 Serial Bus
- Supports the provisions of the IEEE 1394b-2002 Standard at S100 signaling rates
- Enables 1394 100Mbps signals to be transmitted and received across an extended range on unshielded twisted pair cable
- Includes built-in protection from electrostatic discharge (ESD)[6] for all FireWire and CAT 5 lines, by suppressing all transient high voltages down to the allowed level. In particular, ESD protection for high-speed data lines to IEC 61000-4-2 (ESD) 15kV (air), 8kV (contact), IEC 61000-4-5 (Lightning) 12A (8/20us), and IEC 61000-4-4 (EFT) 40A (5/50ns)

To achieve the best performance:

- Avoid interference from neighboring electrical appliances that may adversely influence signal quality
- Position your Kramer **TP-400FW** away from moisture, excessive sunlight and dust

1 Originally developed by Apple™ and published as IEEE 1394 by the Institute of Electrical and Electronics Engineers

2 Hardware items include digital cameras, computers, printers, VCRs, CD-ROMs, hard disks, scanners and graphic cards

3 Configures automatically. Whenever a device is added or removed the 1394 bus re-enumerates

4 You can connect and disconnect inputs and outputs dynamically, without having to restart the PC or cycle power

5 Video / audio applications require constant transfer rates, which the serial bus provides by supporting isochronous transfers

6 When connecting a "live" DV source to a receptor, an electrical potential difference or any other element could create a high voltage (such as ESD or a live chassis) which could permanently damage one or both of the connected devices. This high voltage may be seen as a spark occurring at the instant of connection, or may not be seen at all, but nevertheless can result in costly damage

4 Your TP-400FW FireWire Range Extender

Figure 1, Table 1 and Table 2 define the **TP-400FW**:

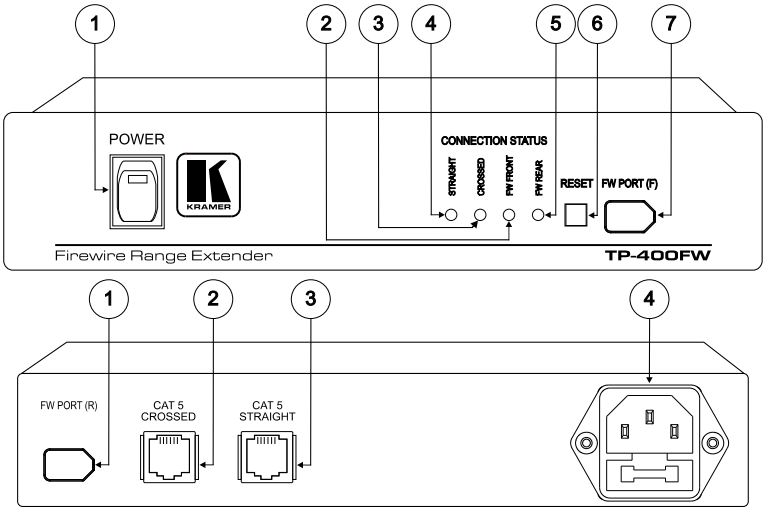

Figure 1: TP-400FW FireWire Range Extender

Table 1: Front Panel TP-400FW FireWire Range Extender Features

#	Feature		Function
1	*POWER* Switch		Illuminated switch for turning the unit ON or OFF
2	*CONNECTION STATUS* (Green) LEDs	*STRAIGHT*	Lights when a connection is established using a CAT5 cable that connects to the *STRAIGHT* RJ45 Connector
3		*CROSSED*	Lights when a connection is established using a CAT5 cable that connects to the *CROSSED* RJ45 Connector
4		*FW FRONT*	Lights when a connection is established between a fully functioning FireWire device and the FireWire port on the front panel (item 7 in Table 1)
5		*FW REAR*	Lights when a connection is established between a fully functioning FireWire device and the FireWire port on the rear panel (item 1 in Table 2)
6	*RESET* Button		Reboots the setup (without having to disconnect and reconnect the power)
7	*FW PORT (F)*		Connects to the FireWire device

Table 2: Rear Panel TP-400FW FireWire Range Extender Features

#	Feature	Function
1	*FW PORT (R)*	Connects to the FireWire device
2	*CAT 5 CROSSED* RJ45 Connector	Connects to the CAT 5 Straight connector on another TP-400FW unit
3	*CAT 5 STRAIGHT* RJ45 Connector	Connects to the CAT 5 Crossed connector on another TP-400FW unit
4	Power Connector with *FUSE*	AC connector enabling power supply to the unit

5 Using Your TP-400FW FireWire Range Extender

The standard FireWire range between two FireWire devices is limited to 4.5m (13.5ft), as Figure 2 illustrates:

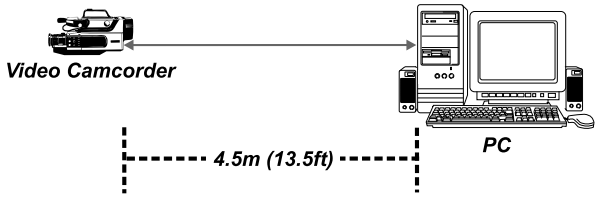

Figure 2: Connecting 2 FireWire Devices (Standard 4.5m Range)

5.1 Connecting 2 FireWire Devices via 2 TP-400FW Units

You can interconnect a pair of FireWire devices (for example, a Webcam and a PC) over an extended range of up to 100m (300ft), using two **TP-400FW** units, as Figure 3 illustrates.

To interconnect a pair of **TP-400FW** units using twisted pair UTP/CAT 5 cable (commonly used for Ethernet connections), do the following:

1. On each **TP-400FW** unit, connect[1] the power cord[2] and turn the unit ON. **It is possible to connect the power cord to only one of the TP-400FW units. (In this case, the other TP-400FW unit will derive its power from that unit via the CAT-5 cable). The CAT-5 STRAIGHT connector is always the source of the power, and the CAT-5 CROSSED connector is always the acceptor of the power**.
2. Connect the CAT-5 Straight RJ45 connector on the first **TP-400FW** unit to the CAT-5 Crossed RJ45 connector on the second **TP-400FW** unit, **when using a straight pin to pin cable** with RJ-45 connectors[3].
   If you are using a **crossover cable** with RJ-45 connectors, connect the CAT-5 Straight RJ45 connector on the first **TP-400FW** unit to the CAT-5 Straight RJ45 connector on the second **TP-400FW** unit[4].
3. Connect a FireWire device (for example, a PC) to the FW PORT (R) or (F) on the first **TP-400FW** unit, and a FireWire device (for example, a Webcam) to the FW PORT (R) or (F) on the second **TP-400FW** unit.

1 Not illustrated in Figure 3

2 We recommend that you use only the power cord that is supplied with this machine

3 Alternatively, connect the CAT-5 Crossed RJ45 connector on the first TP-400FW unit to the CAT-5 Straight RJ45 connector on the second TP-400FW unit

4 Alternatively, connect the CAT-5 Crossed RJ45 connector on the first TP-400FW unit to the CAT-5 Crossed RJ45 connector on the second TP-400FW unit

4. Be sure that the source and acceptor are powered-up (from their own power supply or via the **TP-400FW** FireWire bus).
   The relevant CONNECTION STATUS green LEDs light (see items 2, 3, 4 and 5 in Table 1).

Notes:

- Apply the same rules for both source and destination FireWire equipment (that is, first connect the power to both **TP-400FW** units and only then connect the Firewire cables)
- When reconnecting two **TP-400FW** units, first disconnect the cable, and only then reconnect them
- Wait 5 seconds (after completing all the connections) for the picture to appear on the destination device. If the picture fails to appear on the destination device after 5 seconds, press the *RESET* Button to reboot the setup. Wait another 5 seconds for the picture to appear on the destination device

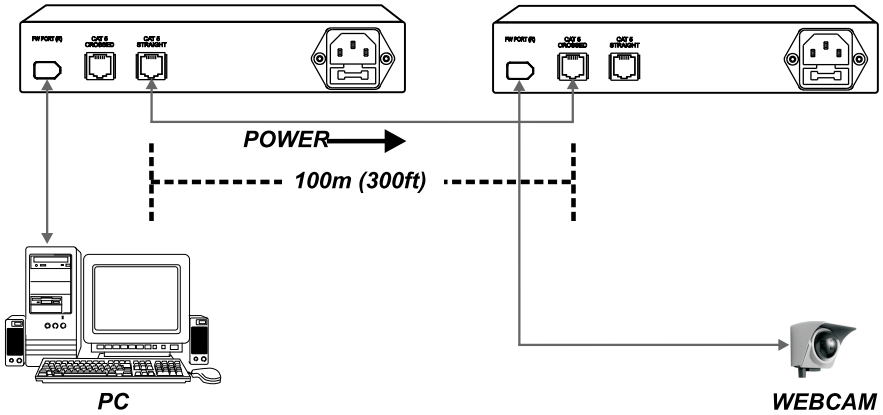

Figure 3: Connecting 2 FireWire Devices via 2 TP-400FW Units (Extended 100m Range)

5.2 Connecting 2 FireWire Devices via Several TP-400FW Units

You can interconnect multiple **TP-400FW** units to extend the FireWire range. Each additional **TP-400FW** extends the range up to a further 100m. For example, Figure 4 illustrates how three **TP-400FW** units may be used to extend the FireWire range to 200m.

To interconnect three **TP-400FW** units using twisted pair UTP/CAT 5 cable (commonly used for Ethernet connections), do the following:

1. On each **TP-400FW** unit, connect[1] the power cord[2] and turn the unit ON. (It is possible to connect the power cord to only one of the **TP-400FW** units. The other **TP-400FW** units will derive their power from that unit).
2. Connect the CAT 5 Straight RJ45 connector on the first **TP-400FW** unit to the CAT 5 Crossed RJ45 connector on the second **TP-400FW** unit, and connect the CAT 5 Straight RJ45 connector on the second **TP-400FW** unit to the CAT 5 Crossed RJ45 connector on the third **TP-400FW** unit[3].
3. Connect a FireWire device (for example, a video camcorder) to the FW PORT (R) on the first **TP-400FW** unit, and a FireWire device (for example, a PC) to the FW PORT (F) on the third **TP-400FW** unit.
4. Be sure that the power on each device is turned ON.
   The relevant CONNECTION STATUS green LEDs light (see items 2, 3, 4 and 5 in Table 1) as follows:
   - On the first **TP-400FW** unit, the *STRAIGHT* and the *FW REAR* LEDs
   - On the second **TP-400FW** unit, the *STRAIGHT* and the *CROSSED* LEDs
   - On the third **TP-400FW** unit, the *CROSSED* and the *FW FRONT* LEDs

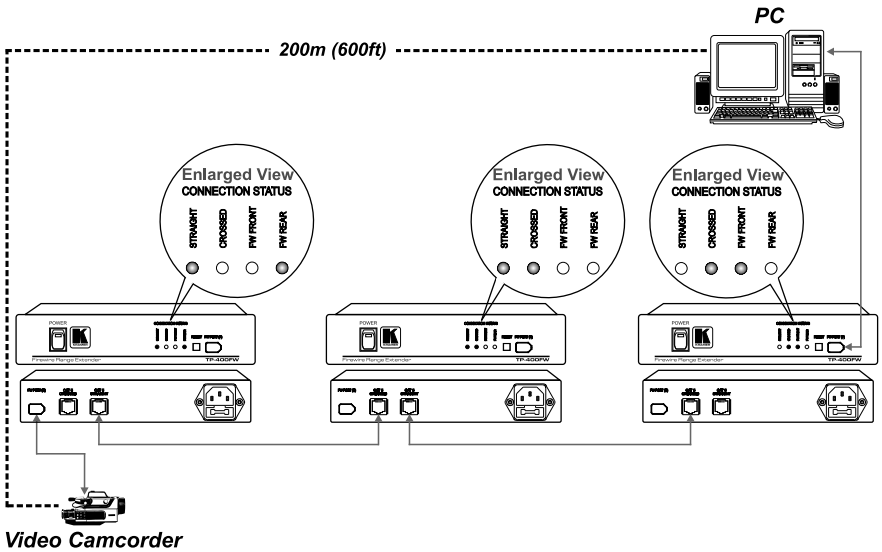

Figure 4: Connecting 2 FireWire Devices via 3 TP-400FW Units (Extended 200m Range)

1 Not illustrated in Figure 4

2 We recommend that you use only the power cord that is supplied with this machine

3 Alternatively, connect the CAT 5 Crossed RJ45 connector on the first TP-400FW unit to the CAT 5 Straight RJ45 connector on the second TP-400FW unit, and connect the CAT 5 Crossed RJ45 connector on the second TP-400FW unit to the CAT 5 Straight RJ45 connector on the third TP-400FW unit

6 Technical Specifications

Table 3 includes the technical specifications:

Table 3: Technical Specifications[1] of the TP-400FW FireWire Range Extender

PORTS:	One Front Panel and Rear Panel 6-pin serial 1394 port 2 RJ45 CAT-5 ports
TRANSFER RATE:	100Mbps
IEEE-1394 STANDARDS:	IEEE 1394a-2000, IEEE 1394-1995, IEEE 1394b-2002 @ up to 100Mbps
ESD LINE PROTECTION:	IEC 61000-4-2 (ESD) 15kV (air), 8kV (contact), IEC 61000-4-5 (Lightning) 12A (8/20us), and IEC 61000-4-4 (EFT) 40A (5/50ns)
POWER SOURCE:	230 VAC, 50/60 Hz. (115VAC, U.S.A.) 30VA
DIMENSIONS:	22cm x 18cm x 4.5cm (8.7" x 7" x 1.7") W, D, H.
WEIGHT:	1.3 kg (2.9 lbs.) approx.
ACCESSORIES:	Power cord
OPTIONS:	RK 80 19" rack kit

1 Specifications are subject to change without notice

LIMITED WARRANTY

Kramer Electronics (hereafter *Kramer*) warrants this product free from defects in material and workmanship under the following terms.

HOW LONG IS THE WARRANTY

Labor and parts are warranted for three years from the date of the first customer purchase.

WHO IS PROTECTED?

Only the first purchase customer may enforce this warranty.

WHAT IS COVERED AND WHAT IS NOT COVERED

Except as below, this warranty covers all defects in material or workmanship in this product. The following are not covered by the warranty:

1. Any product which is not distributed by Kramer, or which is not purchased from an authorized Kramer dealer. If you are uncertain as to whether a dealer is authorized, please contact Kramer at one of the agents listed in the web site www.kramerelectronics.com.
2. Any product, on which the serial number has been defaced, modified or removed.
3. Damage, deterioration or malfunction resulting from:
   - i) Accident, misuse, abuse, neglect, fire, water, lightning or other acts of nature
   - ii) Product modification, or failure to follow instructions supplied with the product
   - iii) Repair or attempted repair by anyone not authorized by Kramer
   - iv) Any shipment of the product (claims must be presented to the carrier)
   - v) Removal or installation of the product
   - vi) Any other cause, which does not relate to a product defect
   - vii) Cartons, equipment enclosures, cables or accessories used in conjunction with the product

WHAT WE WILL PAY FOR AND WHAT WE WILL NOT PAY FOR

We will pay labor and material expenses for covered items. We will not pay for the following:

1. Removal or installations charges.
2. Costs of initial technical adjustments (set-up), including adjustment of user controls or programming. These costs are the responsibility of the Kramer dealer from whom the product was purchased.
3. Shipping charges.

HOW YOU CAN GET WARRANTY SERVICE

1. To obtain service on you product, you must take or ship it prepaid to any authorized Kramer service center.
2. Whenever warranty service is required, the original dated invoice (or a copy) must be presented as proof of warranty coverage, and should be included in any shipment of the product. Please also include in any mailing a contact name, company, address, and a description of the problem(s).
3. For the name of the nearest Kramer authorized service center, consult your authorized dealer.

LIMITATION OF IMPLIED WARRANTIES

All implied warranties, including warranties of merchantability and fitness for a particular purpose, are limited in duration to the length of this warranty.

EXCLUSION OF DAMAGES

The liability of Kramer for any effective products is limited to the repair or replacement of the product at our option. Kramer shall not be liable for:

1. Damage to other property caused by defects in this product, damages based upon inconvenience, loss of use of the product, loss of time, commercial loss; or:
2. Any other damages, whether incidental, consequential or otherwise. Some countries may not allow limitations on how long an implied warranty lasts and/or do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations and exclusions may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights, which vary from place to place.
NOTE: All products returned to Kramer for service must have prior approval. This may be obtained from your dealer.
This equipment has been tested to determine compliance with the requirements of:

EN-50081:	"Electromagnetic compatibility (EMC); generic emission standard. Part 1: Residential, commercial and light industry"
EN-50082:	"Electromagnetic compatibility (EMC) generic immunity standard. Part 1: Residential, commercial and light industry environment".
CFR-47:	FCC Rules and Regulations: Part 15: "Radio frequency devices Subpart B – Unintentional radiators"

CAUTION!

- Servicing the machines can only be done by an authorized Kramer technician. Any user who makes changes or modifications to the unit without the expressed approval of the manufacturer will void user authority to operate the equipment.
- Use the supplied DC power supply to feed power to the machine.
- Please use recommended interconnection cables to connect the machine to other components.

For the latest information on our products and a list of Kramer distributors, visit our Web site: www.kramerelectronics.com.
Updates to this user manual may be found at http://www.kramerelectronics.com/manuals.html.
We welcome your questions, comments and feedback.

Kramer Electronics, Ltd.
Web site: www.kramerelectronics.com
E-mail: info@kramerel.com
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